

# Transportation Systems Management & Operations TSM&O

## National Overview



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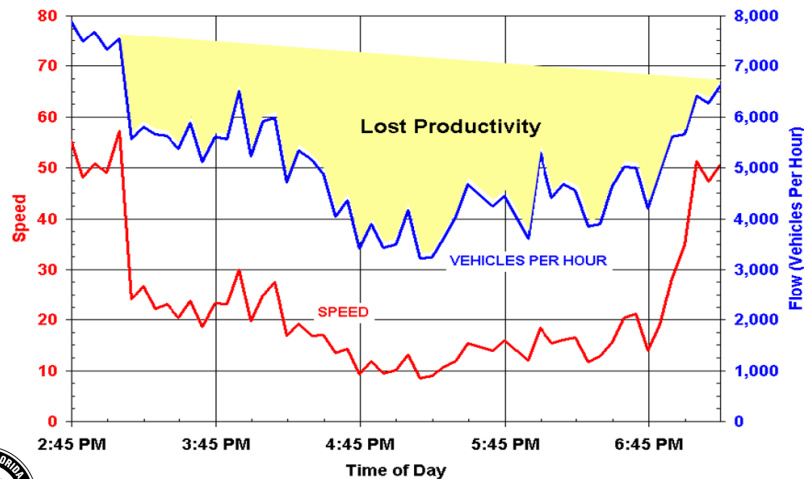
## National Congestion

- 4.8 Billion Hours of Extra Time in Urban Areas Nationally
- \$101 Billion Cost of Extra Time and Fuel in Urban Areas
- Commuter Cost of \$713 Compared to \$301 in 1982
- Peak Period Delay for Average Commuter was 34 Hours from 14 in 1982

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## Unmanaged Traffic Impacts with Limited Capacity Options:

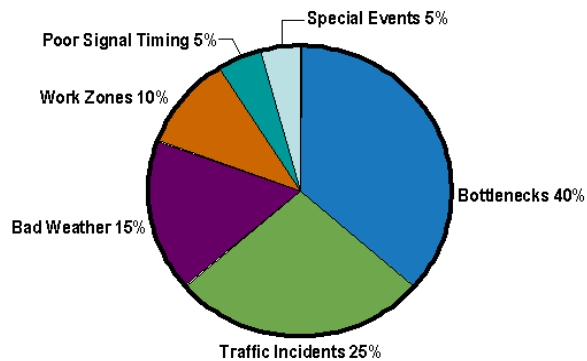


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## Causes of Delay: Some Addressed Only via TSM&O

- “Non-Recurring Congestion” (Crash, Weather, Construction, etc.) Causes More Delay than Capacity Shortfalls
- Compare the Seven Causes of Delay/Disruption



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## Focus on Systems Management and Operations

*“Maximizing the level of service from the existing system, anticipating/responding to service disruptions”*

- Note: Some Terminology Confusion:
  - TSM&O, “SO&M,” “Systems Operations,” ITS, “Congestion Management,” etc.



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## NATIONAL PICTURE



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## Wide Range of Strategies to Match Causes of Congestion

### Conventional Strategies

- Emergency/Incident Management
- Freeway Management
- Special Event Management
- Work Zone Management
- Travel Weather Management
- Traveler Information

### Newer Strategies

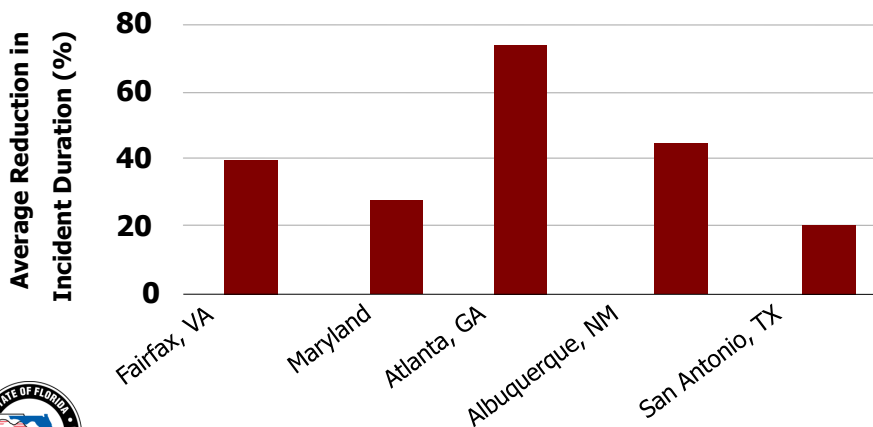
- Traffic Responsive Signalization
- Demand Management
- Integrated Corridor Management
- Active (Freeway) Traffic Management



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## “But we’re doing it”? .....But Big Differences in Similar Regions



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## Unexploited Potential: Impact of Best Practice

<b>TSM&amp;O Strategies</b>	<b>Potential Delay Reduction (plus improved reliability)</b>
Flow control/ramp metering	<b>7-8%</b>
Traffic responsive signals	<b>10-12%</b>
Incident management	<b>10-15%</b>
Work zone traffic management	<b>3-4%</b>
Weather information	<b>2-3%</b>
Traveler information	<b>1-2%</b>
Active Traffic Management/Managed Lanes	<b>15%</b>
Pricing	<b>20%</b>



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## NATIONAL BEST PRACTICE



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## Example National Best Practice: Incident Response Strategies

QUICK CLEARANCE AND RECOVERY STRATEGIES	Abandoned Vehicle Hazards	Lengthy Minor Incident Clearance	Lengthy Major Incident Clearance	Liability Concerns	EXAMPLE APPLICATIONS
Abandoned Vehicle Legislation/Policy	●				21+ U.S. Metropolitan Areas, IN, NC
Safe, Quick Clearance Laws— <i>Driver Removal</i>		●			~25 States, including FL, GA, MD, NC, OH, SC, TN, TX, VA, WI
Service Patrols		●			130+ U.S. Metropolitan Areas, AZ (Phoenix), CA, FL, GA (Atlanta), IN, MD, MN, NM (Albuquerque), OR, TN, UT (Salt Lake City)
Vehicle-Mounted Push Bumpers		●			CA (Redding, Stockton), MD (Baltimore), NJ/PA (Delaware Valley Region), OH (Cincinnati), TN (Chattanooga), TX (Austin), UT (Salt Lake City)
Incident Investigation Sites		●			16+ U.S. Metropolitan Areas, TX (Houston)
Safe, Quick Clearance Laws— <i>Authority Removal</i>		●	●	●	AZ, CA, CO, FL, GA, IL, IN, KY, MO, NM, NC, OH, OR, SC, TN, TX, VA, WA
Quick Clearance/Open Roads Policy		●	●		35+ U.S. Metropolitan Areas, CA, FL, GA, ID, IN, LA, MD, NV, NH, TN, UT, WA, WI
Non-cargo Vehicle Fluid Discharge Policy		●	●		FL, MN
Fatality Certification/Removal Policy			●		PA, TN, TX (Austin), WA
Expedited Crash Investigation			●		93+ U.S. Metropolitan Areas, FL, IN, TX (North Central Region), UT
Quick Clearance Using Fire Apparatus			●		TX (Austin)
Towing and Recovery Quick Clearance Incentives			●		FL, GA, WA
Major Incident Response Teams			●		DE, FL, IL (Chicago), LA, MD, NJ, OH (Cincinnati, Columbus), NY, TX (Dallas Co.), WA

## Example National Best Practice: Performance Measurement Strategies

PERFORMANCE MEASUREMENT STRATEGIES	Inconsistent Definitions	Lack of Consensus/ Data	Limited Data Sharing/ Accessibility	EXAMPLE APPLICATIONS
National Performance Measurement Guidance	●	●		TIM Focus State Initiative (FSI), TIM Performance Measurement Knowledge Management System/Listserv
Annual TIM Self-Assessment		●		75+ U.S. Metropolitan Areas
Strong Funding and Performance Link		●		MD, WA
Multi-agency Data Exchange Protocol		●	●	CA (San Diego), CO (El Paso/Teller Co.), NV (Clark Co.), TX (Ft. Worth), UT, WA

## Example National Best Practice: Incorporation of TSM&O into Planning

### **Traditional Planning Process**

- ✓ Elected/appointed officials
- ✓ Collective regional plan development
- ✓ Long-term planning focus
- ✓ Near-term project funding
- ✓ Projects of local and regional significance
- ✓ Historical trends

### **Planning Influenced by TSM&O**

- ✓ "Operations thinking" influences vision
- ✓ Decisions engage operations managers
- ✓ Operations/capital mix optimized
- ✓ Performance measures reflect objectives
- ✓ Regional performance informs

Improving *regional* transportation system performance



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## NATIONAL TRENDS



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## Frontier Re-Strategies and Technology

- Mobile Communications
  - Third-party provision (probe data)
  - Source fusion
  - Cloud Computing/Access
  - Remote Maintenance
  - Connected Vehicle Data
  - Social Media/Apps for Customer Services



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## Enhanced Capacity for ADTM

- Integration, Prediction, Adaptation
  - Corridor management
  - Weather management
  - Emergency management
  - Arterial networks
- In-Vehicle Signing (instead of DMS)
- Multiple Personal Customer Travel Apps



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## Process/Organization Impacts

- Virtual TMC (distributed)
- Increased Outsourcing, PPPs
- Multi-Agency Integration (place-free)
- Reduced Costs/Staffing Flexibility
- Extended Hours/Coverage (rural)
- Ability to Price
- Increased Customer Interaction/Support



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## NATIONAL RESEARCH FOR CONTINUOUS IMPROVEMENT



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## Findings of National Study of “Leading” vs. “Average” Practice

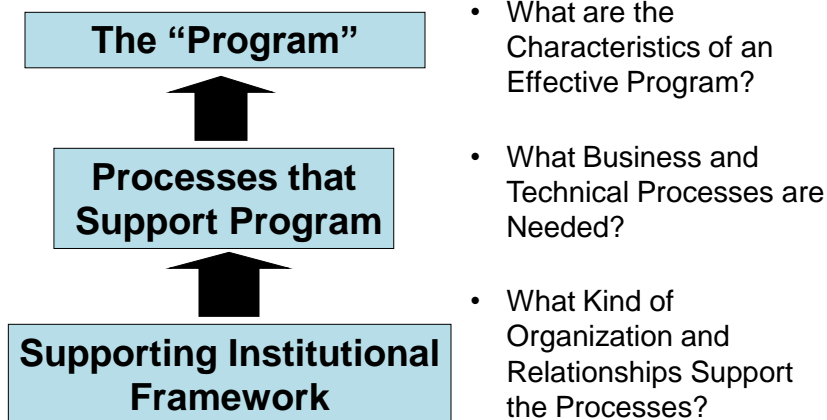
- Less Effective Programs – not just funding
- **Problem:** TSM&O ad hoc
  - Not mainstreamed as formal “*core program*”
  - Lacks multi-year plan/sustainable budget,
  - Minimal consolidation/accountability
  - Core staff capabilities



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## Nationwide Survey of Best Practice: Process and Organization Key



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## Dimensions of Improved Capability

1. **Planning/Program** – Formal, Multi-year, Integrated
2. **Systems & Technology** – Consistent and Standardized
3. **Performance** – Actually *Used* to Improve Procedures/Protocols
4. **Culture** – Top Management Support/Regional Accountability
5. **Organization** – HQ Support, Program Status
6. **Resources** – line Item Budget
7. **Collaboration** – Formal Relationships and Business Arrangements



**Is this any different than other DOT programs?**

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## What it Takes:

**TSM&O Mainstreamed as a Top-level Formal Program**



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## A Few States Have Fully Mainstreamed Operations as a Formal Top-level DOT Strategy



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## Evaluating the Agency's Current State-of-Play (Self-Evaluation)



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## RESOURCES AVAILABLE TO SUPPORT DOT IMPROVEMENTS IN CAPABILITY FOR EFFECTIVE TSM&O

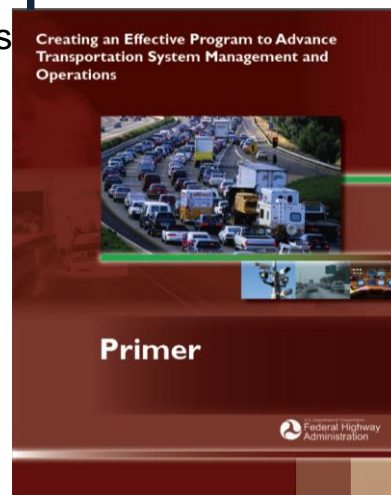


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## FHWA Operations Capability Workshops

- FHWA-Sponsored Operations Capability Workshops
- Can be at Statewide or Regional Level
  - Usually one day
- Participants are Managers Involved with TSM&O, Planners, Partners
- Have Conducted Full Workshop in Broward Co. with D4 and D6



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## Range of Available FHWA Resources

- Integrating Operations, Safety, and Multimodal Planning Workshop
- Traffic Incident Management Peer Exchange and Workshops
- Technical Assistance for Traffic Signal Timing Training
- Work Zone Process Review Team
- Performance Measures Workshop
- Traffic Data Collection and Analysis Peer Exchange
- Operations B/C Workshops
- Outreach for Special Events Peer Training
- Integrating Road Weather Mobile Observations
- Active Traffic Management Workshop
- Rural Incident Management Workshop



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## FHWA Technical Resources (Web)

The screenshot shows the FHWA Office of Operations website. The header includes the U.S. Department of Transportation logo and the text 'U.S. Department of Transportation Federal Highway Administration OFFICE OF OPERATIONS'. Below the header is a banner with the text '21<sup>ST</sup> CENTURY OPERATIONS USING 21<sup>ST</sup> CENTURY TECHNOLOGIES'. The main content area is titled 'Reducing Non-Recurring Congestion' and includes a search bar, a sidebar with navigation links (Home, About Operations, Program Directory, Program Areas, Regulation/Policy, Publications, Speeches, Press Room, Links, Subject Index, Feedback), and a list of links: Traffic Incident Management, Planned Special Events Traffic Management, Work Zone Management, Road Weather Management, and Congestion Mitigation. A URL <http://ops.fhwa.dot.gov/index.asp> is displayed. The footer contains the FHWA logo and links to US DOT Home, FHWA Home, Operations Home, and Privacy Policy.

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# AASHTO Guide to SO&M Improvement

- Web-Based
- Agency Self-Evaluation-Based
- Provides Custom-Tailored (Detailed) Guidance
- Appropriate Incremental Steps



Home | Login | Register

## Systems Operations & Management Guidance

One-Minute Guidance Evaluation Learn About the Guidance Customized Guidance Evaluation Browse Guidance

### What Is Systems Operations and Management (SO&M)?

Systems Operations and Management (SO&M) is a set of strategies to anticipate and manage traffic congestion, and minimize the other unpredictable causes of service disruption, delay, and crashes. This website is an online tool that uses self-evaluation and best practice experience that managers can use to identify key program, process and institutional preconditions to achieve more effective SO&M. [Learn More >](#)

### Who Should Use the Guidance and Why?

This website and its guidance is designed for transportation agency managers whose span of control related to the operations and management of the roadway system, including policy makers and program managers related to ITS and SO&M at both the state and regional level, as well as managers of systems operations related activities such as traffic engineering, maintenance, and public safety. The guidance can be used to evaluate agency capabilities in key areas of process and institutional arrangements and to prepare a formal action plan. A self-evaluation customizes the guidance based on current agency capability. [Learn More >](#)

### Why is SO&M Important?

Roadway level-of-service has significantly deteriorated over the last 20 years. Regular congestion has continued to increase, while increasing capacity is constrained by cost and impacts. And, as roadways have reached high volumes, they have become increasingly sensitive to the delay and safety impacts of crashes, construction, and weather, which together are responsible for over one-half of travel delay and most of the resulting unreliability.

<http://www.aashtosomguidance.org/>

**GUIDANCE TO IMPROVE THE EFFECTIVENESS OF YOUR SO&M PROGRAM**

**One-Minute Guidance Evaluation**  
Based on 15 minutes of your time to learn.

**Customized Guidance Evaluation**  
Based on a customizable model of your current program.

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